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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,416	03/23/2004	Mitsuaki Hirokawa	Q80574	2263
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WASHINGTON, DC 20037-3213				
			EXAMINER	
			MENON, KRISHNAN S	
			ART UNIT	PAPER NUMBER
			1797	
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			01/29/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/806,416

**Applicant(s)**

HIROKAWA ET AL.

**Examiner**

Krishnan S. Menon

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

Claims 1-5 are pending as amended 1/8/08 in the RCE of 10/3/07.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 fails to further limit claim 1 from which it depends, in the recitation that the first and second permeate passage materials are the same (monolithic), when claim 1 recites that they are different.

#### ***Double Patenting***

Applicant is advised that should claim 1 be found allowable, claim 5 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

#### ***Claim Rejections - 35 USC § 103***

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/051528, and/or Schmidt (US 6,352,641).

WO teaches low pressure drop spiral wound modules for applications such as reverse osmosis or ultrafiltration as claimed – see example 5. The first permeate side passage material in this reference is integral with the separation membrane (membrane is coated on it. See abstract). The second permeate side passage material, which is wrapped around the core tube, is separate or different from the first permeate side passage material. The example 5 of WO teaches using feed spacer material to wrap around the permeate tube; therefore, it is the “second permeation-side passage material” as claimed. (Please note that the term ‘feed spacer material’ is only a name of the material used, because the material used in this reference is normally used as a feed space material. It is in the permeate passageway, and functions as a permeation side passage material in example 5 of WO).

Schmidt teaches a spiral wound element as seen in the figures and column 1 lines 8-38. Figure 2 of Schmidt also shows multiple wraps of the permeate spacer material around the core as claimed – the first and second permeate-side passage material is the same, or monolithic.

The references do not specifically teach the limitation:

the effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube.

However, this limitation can be optimized for lowest pressure-drop for fluid flow through the perforations and the winding of the permeate side passage material around the core without compromising the strength of the core tube. Since the % opening is given for a specified permeate side passage material (such as the feed spacer used in the WO reference), the number and size of openings of the perforations of the core tube can be varied by design. More openings and larger openings for the perforations would weaken the permeate core tube. Fewer and smaller openings would reduce the flow path and increase pressure drop. Thus it is a result-effective variable, which can be optimized. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). This factor is also commonly used in designing perforated tubes or cores, as seen in the reference Haq et al (US 6,702,941) (column 26, lines 34-55, which teaches that perforated area should be at least equal to the cross-sectional area of the inlet tube to avoid perforations restricting the flow).

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Applicant's argument that the references do not recognize the effective perforated area as a result-effective variable, and therefore, a prima facie case of obviousness is not established is not persuasive. One of ordinary skill in the art would easily recognize it as a result-effective variable. It is also known in the art to optimize the number of perforations to reduce pressure drop, as also shown by the Haq reference.

### ***Response to Arguments***

Arguments are addressed in the rejection.

Applicant's argument that the claims are patentable over the references because they do not teach the second permeate side passage material as different from the first permeate side passage material is not persuasive – the WO reference teaches that.

Argument that the effective perforated-part area is greater than 1.0 times the core tube cross-section area is patentable over the prior arts is also not persuasive. There are multitudes of references that teach spiral wound membranes with permeate tube wherein the permeate spacer is wrapped around the permeate tube at least one round, and wherein the permeate tubes have perforations or slots to carry permeate into the tube. However, none of the references specifically state the size of the tube, the length of the tube, the number and sizes of the perforations, or the percent openings of the permeate spacers, because, such design variables are within the capabilities of one of ordinary skill to design. The commonly used permeate spacer material is the tricot weave material, which is very open. Even if the references do not teach what is claimed

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in the exact terms, applicant's claims do not have anything novel in them; the % opening through the permeate spacer wrap and the perforations taken together in series would be far more than the cross-sectional area of the permeate tube. It is also a common engineering practice to provide the area of perforations of a perforated distribution/collection tube as significantly greater than the cross-sectional area of the tube so that the perforations do not create undue flow resistance (as evidenced by the Haq reference).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Krishnan S Menon  
Primary Examiner  
Art Unit 1797